

Environmental Protection Agency

§ 1065.1001

temperature (T_M) and pressure (P_M). Use the following equation:

$$\text{Intake air flow} = \frac{(\text{displacement})(\text{rpm})(\text{volumetric efficiency})}{(P_M/101.3 \text{ kPa})(293.15 \text{ K}/T_M)}$$

§ 1065.935 Specifications for THC analyzers.

- (a) Use a flame ionization detector (FID).
- (b) The analyzer must have an accuracy and precision of ± 2 percent of point or better under steady-state laboratory conditions.
- (c) The analyzer must reach at least 90 percent of its final response within 1.0 second after any step change to the input concentration greater than or equal 80 percent of full scale.
- (d) Zero and span the analyzer daily during testing. Calibrate it according to the analyzer manufacturer's specifications.

§ 1065.940 Specifications for NO_x and air/fuel sensors.

- (a) Use stabilized zirconia-based sensors.
- (b) The sensors must have an accuracy and precision of ± 2 percent of point or better under steady-state laboratory conditions.
- (c) The sensors must reach at least 90 percent of its final response within 1.0 second after any step change to the input concentration greater than or equal 80 percent of full scale.
- (d) The sensors must be zeroed and spanned daily during testing, and must be calibrated according to the sensor manufacturer's specifications.

§ 1065.945 Specifications for CO analyzers.

- (a) Use a non-dispersive infrared (NDIR) detector that is compensated for CO_2 and water interference.
- (b) The analyzer must have an accuracy and precision of ± 2 percent of point or better under steady-state laboratory conditions.
- (c) The analyzer must reach at least 90 percent of its final response within 5.0 second after any step change to the input concentration greater than or equal 80 percent of full scale.
- (d) The analyzer must be zeroed and spanned daily during testing, and must

be calibrated according to the analyzer manufacturer's specifications.

§ 1065.950 Specifications for speed and torque measurement.

- (a) Determine torque from a previously determined relationship of torque and engine speed, throttle position, and/or manifold absolute pressure. Torque estimates must be between 85 percent and 105 percent of the true value. You can demonstrate compliance with this accuracy requirement using steady-state laboratory data.
- (b) Measure speed from the engine's electronic control module. Speed estimates must be within ± 5 rpm of the true value.

Subpart K—Definitions and Other Reference Information

§ 1065.1001 Definitions.

The following definitions apply to this part. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

Accuracy means the maximum difference between a measured or calculated value and the true value, where the true value is determined by NIST.

Act means the Clean Air Act, as amended, 42 U.S.C. 7401 *et seq.*

Adjustable parameter means any device, system, or element of design that someone can adjust (including those which are difficult to access) and that, if adjusted, may affect emissions or engine performance during emission testing or normal in-use operation.

Aftertreatment means relating to any system, component, or technology mounted downstream of the exhaust valve or exhaust port whose design function is to reduce exhaust emissions.

Auxiliary emission-control device means any element of design that senses temperature, engine speed, motive speed, transmission gear, atmospheric pressure, manifold pressure or vacuum, or any other parameter to activate, modulate, delay, or deactivate the operation of any part of the emission-control system. This also includes any other feature that causes in-use emissions to be higher than those

measured under test conditions, except as we allow under this part.

Brake power has the meaning given in the standard-setting part. If it is not defined in the standard-setting part, brake power means the usable power output of the engine not including power required to operate fuel pumps, oil pumps, or coolant pumps.

Calibration means the set of specifications and tolerances specific to a particular design, version, or application of a component or assembly capable of functionally describing its operation over its working range.

Certification means obtaining a certificate of conformity for an engine family that complies with the emission standards and requirements in this part.

Compression-ignition means relating to a type of reciprocating, internal-combustion engine that is not a spark-ignition engine.

Constant-speed engine means an engine governed to operate only at its rated speed.

Designated Officer means the Manager, Engine Programs Group (6405-J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., Washington, DC 20460.

Emission-control system means any device, system, or element of design that controls or reduces the regulated emissions from an engine.

Emission-data engine means an engine that is tested for certification.

Emission-related maintenance means maintenance that substantially affects emissions or is likely to substantially affect emissions deterioration.

Engine means an engine to which this part applies.

Engine-based means having emission standards related to measurements using an engine dynamometer, in units of grams of pollutant per kilowatt-hour.

Engine family means a group of engines with similar emission characteristics, as specified in the standard-setting part.

Equipment-based or vehicle-based means relating to programs that require that a piece of equipment of vehicle be certified, rather than only the engine.

Fuel system means all components involved in transporting, metering, and mixing the fuel from the fuel tank to the combustion chamber(s), including the fuel tank, fuel tank cap, fuel pump, fuel filters, fuel lines, carburetor or fuel-injection components, and all fuel-system vents.

Fuel type means a general category of fuels such as gasoline or LPG. There can be multiple grades within a single type of fuel, such as summer-grade gasoline and winter-grade gasoline.

Good engineering judgment has the meaning we give it in §1068.5 of this chapter.

Identification number means a unique specification (for example, model number/serial number combination) that allows someone to distinguish a particular engine from other similar engines.

Idle speed means the lowest engine speed with zero load.

NOTE: Warm idle speed is the idle speed of a warmed-up engine.

Manufacturer has the meaning given in section 216(1) of the Act. In general, this term includes any person who manufactures an engine for sale in the United States or otherwise introduces a new engine into commerce in the United States. This includes importers that import engines for resale.

Maximum test torque means:

(1) For throttled engines, the torque output observed at wide-open throttle at a given speed.

(2) For non-throttled engines, the torque output observed with the maximum fueling rate possible at a given speed.

Nonmethane hydrocarbons means the sum of all hydrocarbon species measured by a FID except methane, expressed with an assumed mass 13.876 grams per mole of carbon atoms.

Nonroad means relating to nonroad engines.

Nonroad engine has the meaning given in §89.2 of this chapter. In general this means all internal combustion engines except motor vehicle engines, stationary engines, or engines used solely for competition.

Oxides of nitrogen means compounds containing only nitrogen and oxygen. Oxides of nitrogen are expressed quantitatively as if the NO is in the form of

NO₂ (assume a molecular weight for all oxides of nitrogen equivalent to that of NO₂). This correction is included in the equations specified for calculating NO_x emissions.

Oxygenated fuel means a fuel that is comprised of oxygen-containing compound, such as ethanol or methanol. Generally, testing engines that use oxygenated fuels requires the use of the sampling methods in subpart I of this part. However, you should read the standard-setting part and subpart I of this part to determine which sampling methods to use.

Precision means two times the coefficient of variance of multiple measurements, except where specified otherwise.

Revoking a certificate of conformity means discontinuing the certificate for an engine family. If we revoke a certificate, you must apply for a new certificate before continuing to introduce into commerce the affected engines. This does not apply to engines you no longer possess.

Scheduled maintenance means maintenance (*i.e.*, adjusting, repairing, removing, disassembling, cleaning, or replacing components or systems) that is periodically needed to keep a part from failing or malfunctioning. It also may mean actions you expect are necessary to correct an overt indication of failure or malfunction for which periodic maintenance is not appropriate.

Span means to adjust an instrument so that it gives a proper response to a calibration standard that represents between 75 and 100 percent of the maximum value in the instrument range (*e.g.* a span gas).

Spark-ignition means relating to a gasoline-fueled engine or other engines with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark-ignition engines usually use a throttle to regulate intake air flow to control power during normal operation.

Standard-setting part means the part in the Code of Federal Regulations that defines emission standards for a particular engine (see § 1065.1(a)).

Stoichiometry means the proportion of a mixture of air and fuel such that the fuel is fully oxidized with no remaining

oxygen. For example, stoichiometric combustion in gasoline engines typically occurs at an air-fuel mass ratio of about 14.7.

Suspending a certificate of conformity means temporarily discontinuing the certificate for an engine family. If we suspend a certificate, you may not sell engines from that engine family unless we reinstate the certificate or approve a new one.

Test engine means an engine in a test sample.

Test sample means the collection of engines selected from the population of an engine family for emission testing.

Total Hydrocarbon (THC) means the sum of all hydrocarbon species measured by an FID, expressed with an assumed mass 13.876 grams per mole of carbon atoms.

Total Hydrocarbon Equivalent means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, alcohols and aldehydes, or other organic compounds that are measured separately as contained in a gas sample, expressed as petroleum-fueled engine hydrocarbons. The hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, the U.S. Virgin Islands, and the Trust Territory of the Pacific Islands.

Wide-open throttle means maximum throttle opening for throttled engines. Unless this is specified at a given speed, it refers to maximum throttle opening at maximum speed. For electronically controlled or other engines with multiple possible fueling rates, wide-open throttle also means the maximum fueling rate at maximum throttle opening under test conditions.

Zero means to adjust an instrument so that it gives a proper response to a blank calibration standard (*e.g.* zero-grade air).

EFFECTIVE DATE NOTE: At 69 FR 39263, June 29, 2004, § 1063.1001 was amended by adding the definition for "Operator demand" in alphabetical order, effective Aug. 30, 2004. For the convenience of the user, the added text is set forth as follows:

§ 1065.1005

40 CFR Ch. I (7–1–04 Edition)

§ 1065.1001 Definitions.

* * * * *

Operator demand means an engine operator's input to control engine output. The operator may be a person, a governor, or other controller that mechanically or electronically signals an input that demands engine output. Input may be an accelerator pedal or signal, a throttle-control lever or signal, a fuel lever or signal, a speed lever or signal, or a governor setpoint or signal. Output means engine power, P, which is the product of engine speed, *n*, and engine torque, T.

* * * * *

§ 1065.1005 Symbols, acronyms, and abbreviations.

The following symbols, acronyms, and abbreviations apply to this part:

° degrees.
 " inches.
 ASTM American Society for Testing and Materials.
 C Celsius.
 cc cubic centimeters.
 CFR Code of Federal Regulations.
 CFV critical-flow venturi.
 CI compression-ignition.
 CLD chemiluminescent detector.
 CO carbon monoxide.
 CO₂ carbon dioxide.
 CVS constant-volume sampler.
 DF deterioration factor.
 F Fahrenheit.
 EFC electronic flow control.
 EPA Environmental Protection Agency.
 ft feet.
 FID flame ionization detector.
 g/kW-hr grams per kilowatt-hour.
 g/liter grams per liter.
 g/m³ grams per cubic meter.
 Hz hertz.
 IBP initial boiling point.
 ISO International Organization for Standardization.
 kPa kilopascal.
 lbs. pounds.
 LPG liquefied petroleum gas.
 m meters.
 ml milliliters.
 mm Hg millimeters of mercury.
 NDIR nondispersive infrared.
 NIST National Institute for Standards and Testing.
 NMHC nonmethane hydrocarbons.
 NMHCE nonmethane hydrocarbon equivalent.
 NO nitric oxide.
 NO₂ nitrogen dioxide.
 NO_x oxides of nitrogen (NO and NO₂).
 O₂ oxygen.
 PDP positive-displacement pump.

ppm parts per million.
 ppmC parts per million carbon.
 RMS root-mean square.
 rpm revolutions per minute.
 sec seconds.
 SI spark-ignition.
 THC total hydrocarbon.
 THCE total hydrocarbon equivalent.
 U.S.C. United States Code.

§ 1065.1010 Reference materials.

We have incorporated by reference the documents listed in this section. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW., Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(a) *ASTM material.* Table 1 of § 1065.1010 lists material from the American Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428. Table 1 follows:

TABLE 1 OF § 1065.1010—ASTM MATERIALS

| Document number and name | Part 1065 reference |
|---|---------------------|
| ASTM D 86–01, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure | 1065.210 |
| ASTM D 323–99a, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method) | 1065.210 |
| ASTM D 1266–98, Standard Test Method for Sulfur in Petroleum Products (Lamp Method) | 1065.210 |
| ASTM D 1319–02, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption | 1065.210 |